
**Welcome to the 132nd Meeting
of the
National Petroleum Council**

Washington, D.C.

December 14, 2022

National Petroleum Council

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National Petroleum Council

Short-Term Actions & Transition Strategies

Petroleum Market Developments – Progress and Actions to Increase Supply and Improve Resilience

Principles and Oil and Gas Industry Initiatives and Technologies for Progressing to Net Zero

**Andy Madden
Subcommittee Chair**

December 14, 2022

Study Request and Reports

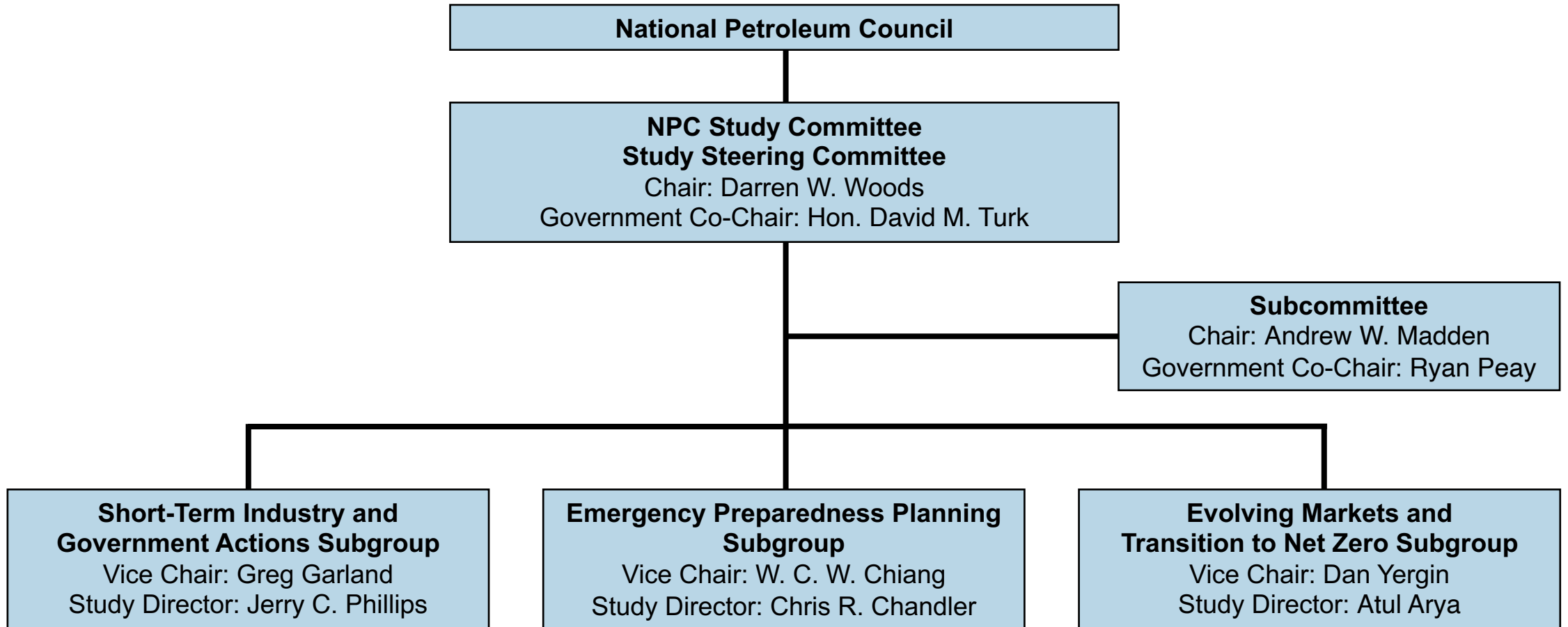
Secretary Granholm met with NPC CCC on July 1st and followed up with a written request on July 29th for the NPC to provide information and advice on:

- 1. How industry is working to supply oil and refined products to U.S. consumers**
- 2. Near-term steps the administration can consider to increase physical supply**
- 3. The evolving global oil market and its impact on U.S. producers, suppliers and refiners**
- 4. Industry steps to actively support a net-zero economy by 2050**

Report issued in two separate parts

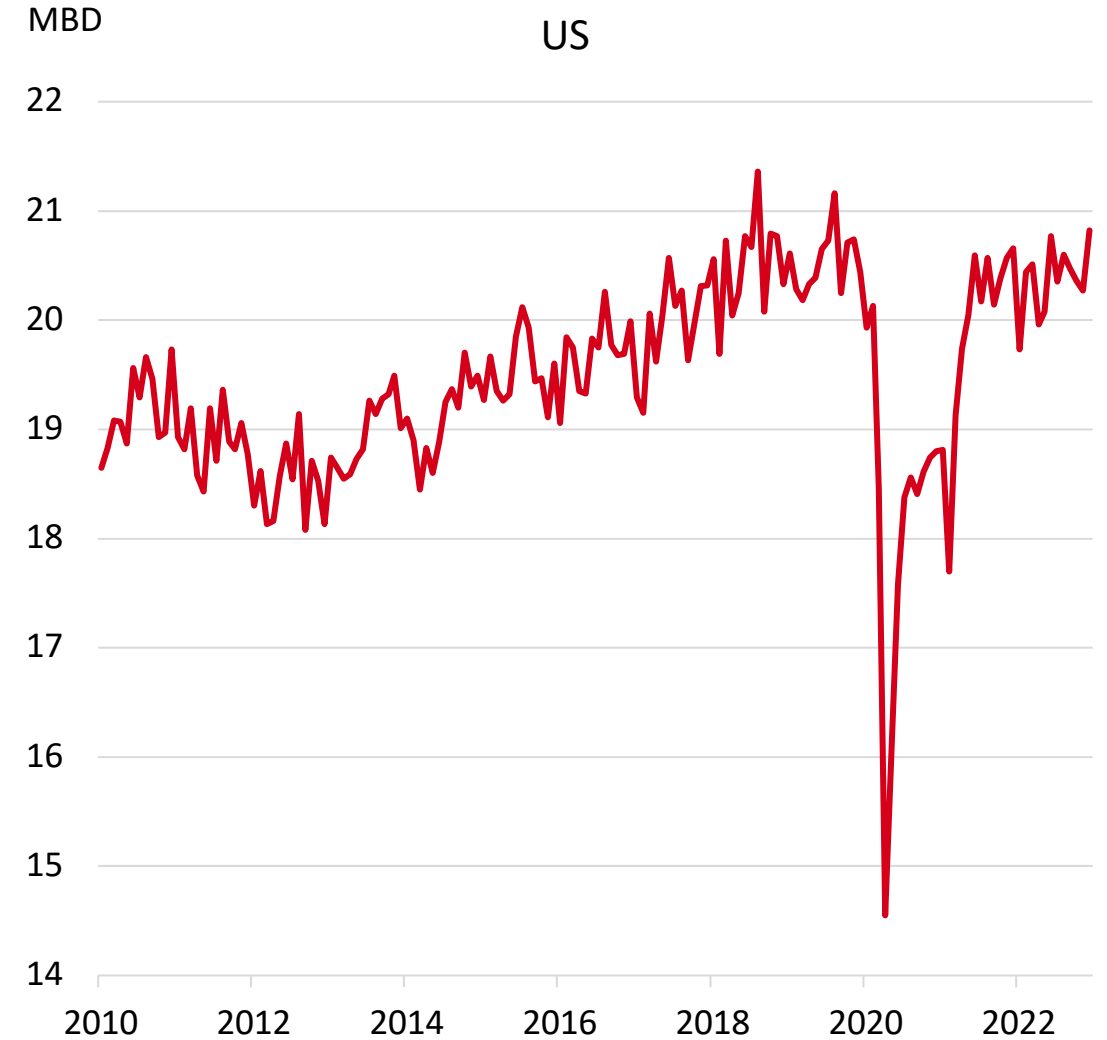
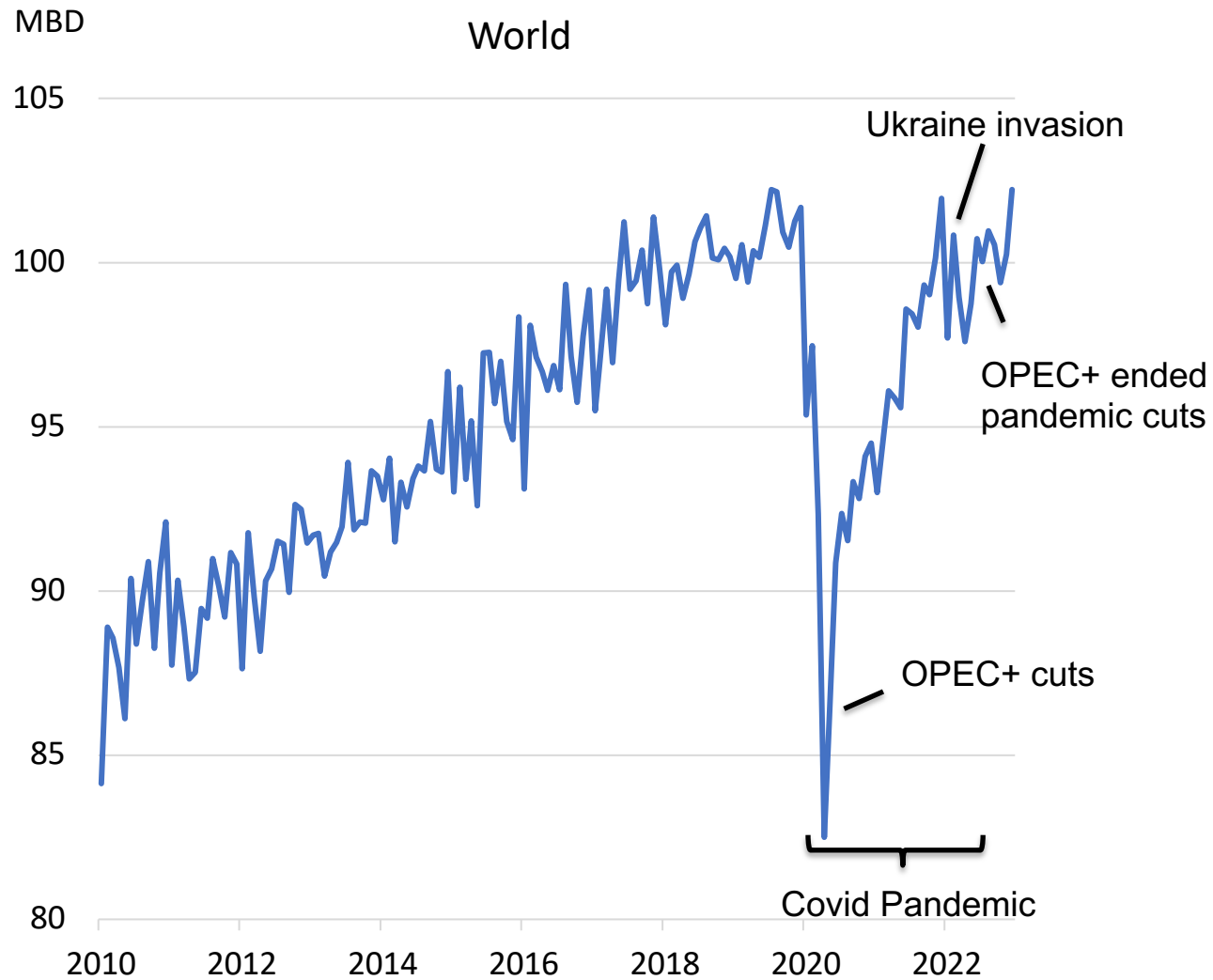
- 1. Petroleum Market Developments - Progress and Actions to Increase Supply and Improve Resilience (including Strengthening Emergency Preparedness)**
- 2. Principles and Oil and Gas Industry Initiatives and Technologies for Progressing to Net Zero**

Organizational Structure

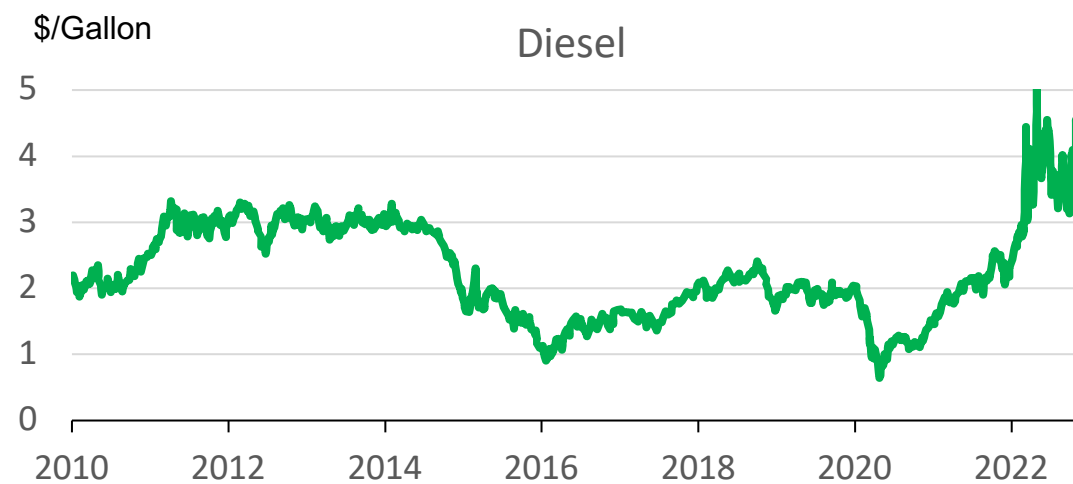
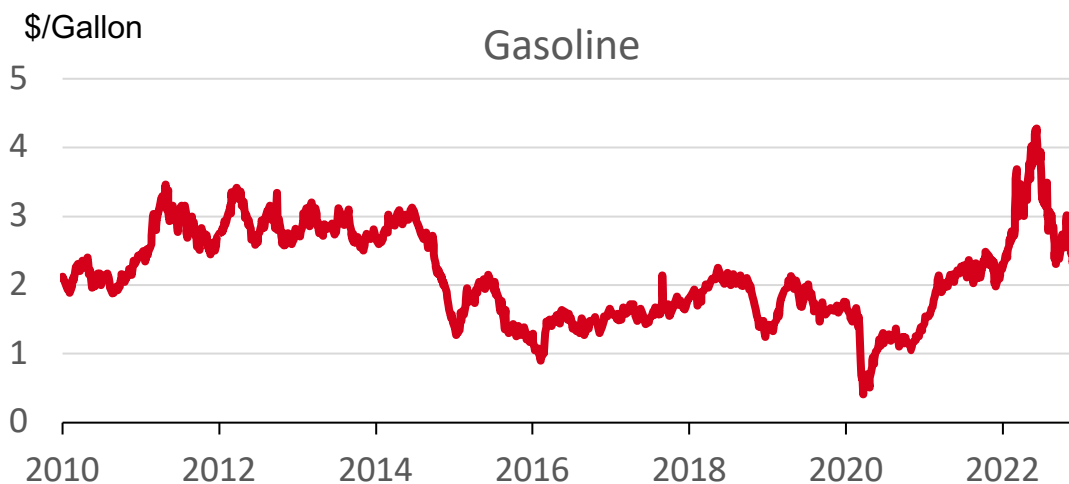
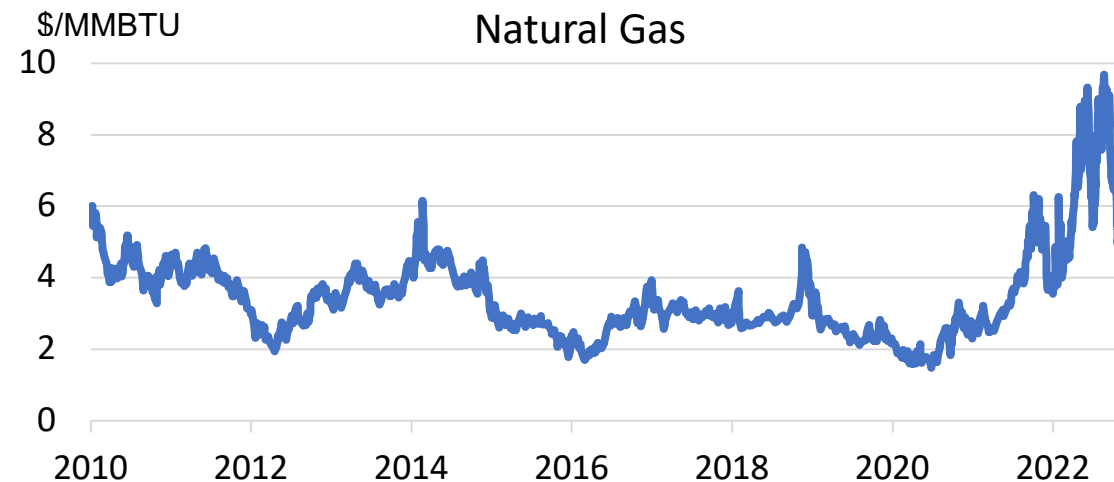
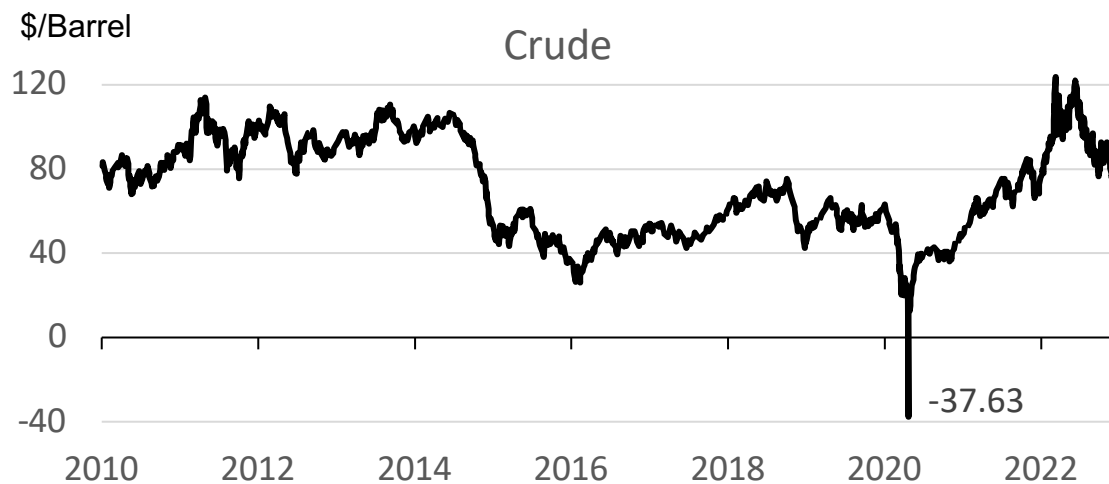


Petroleum Market Developments – Progress and Actions to Increase Supply and Improve Resilience

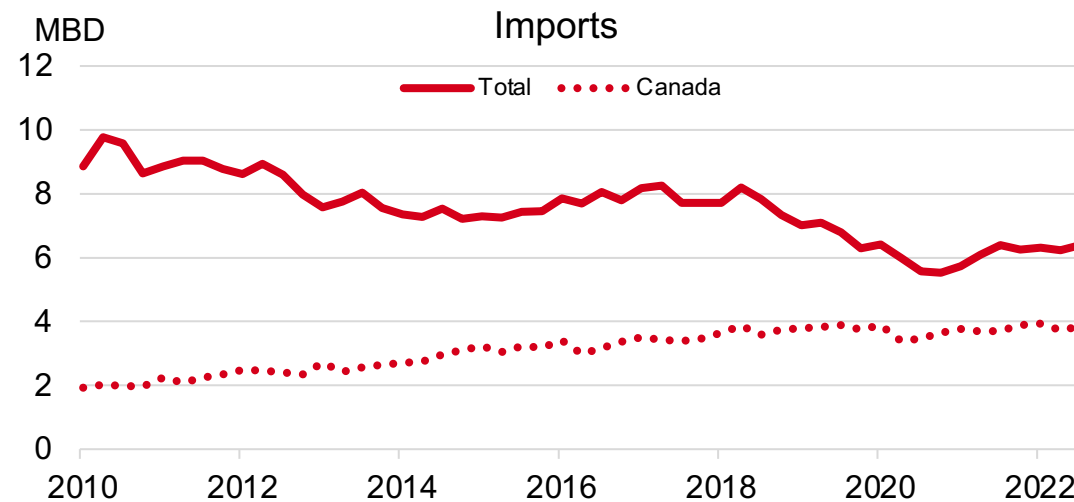
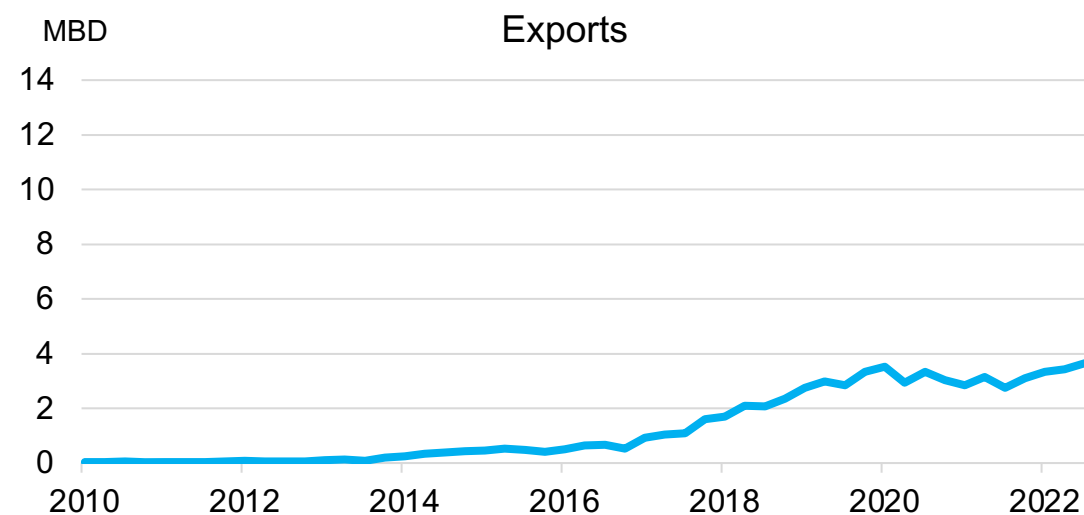
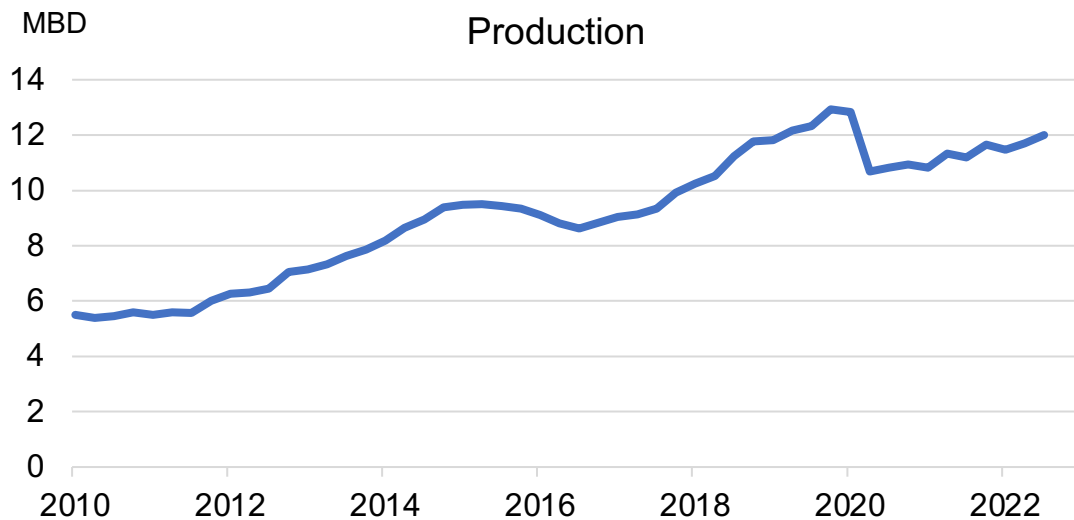
Oil Demand – Major Impacts of COVID Pandemic



U.S. Prices – Impact of Supply and Demand

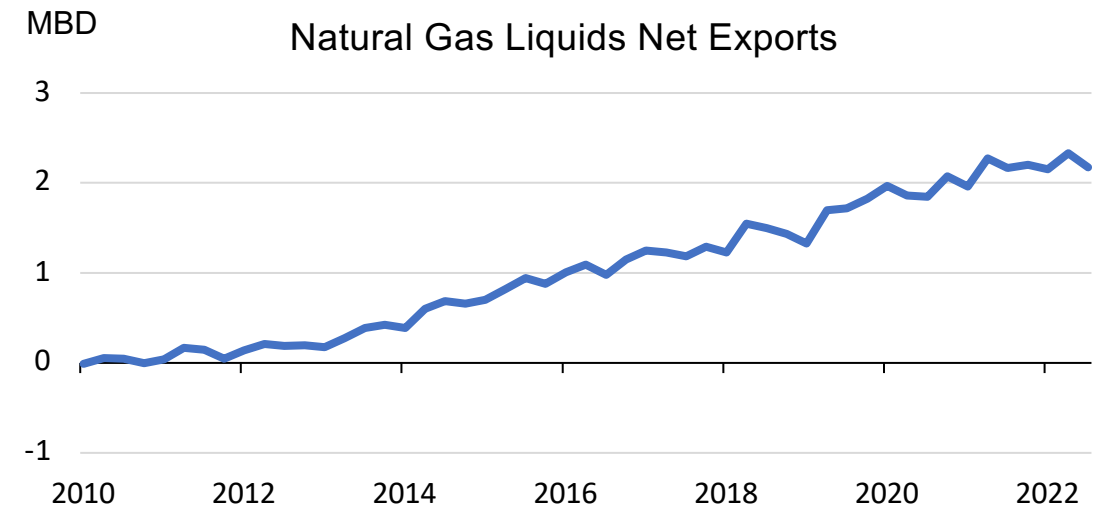
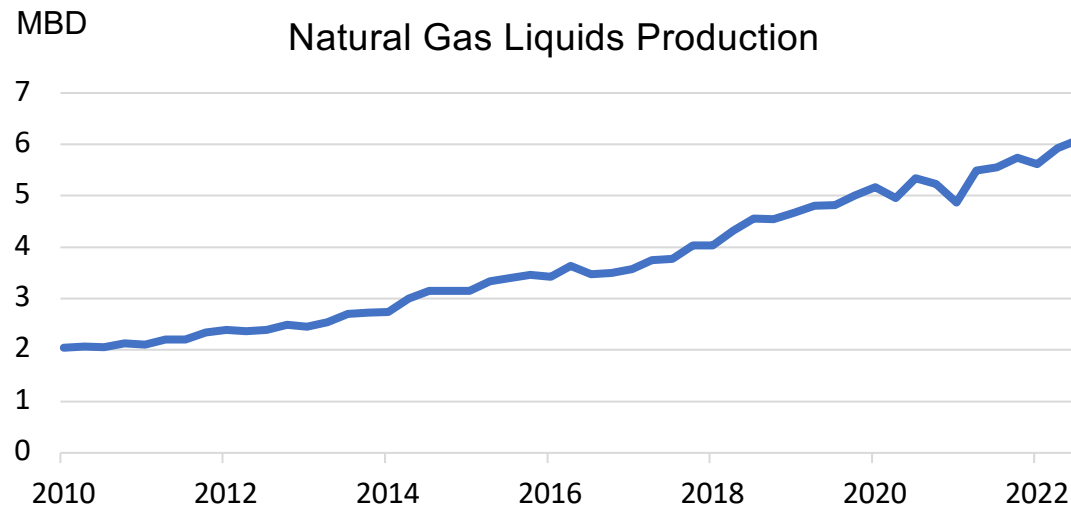
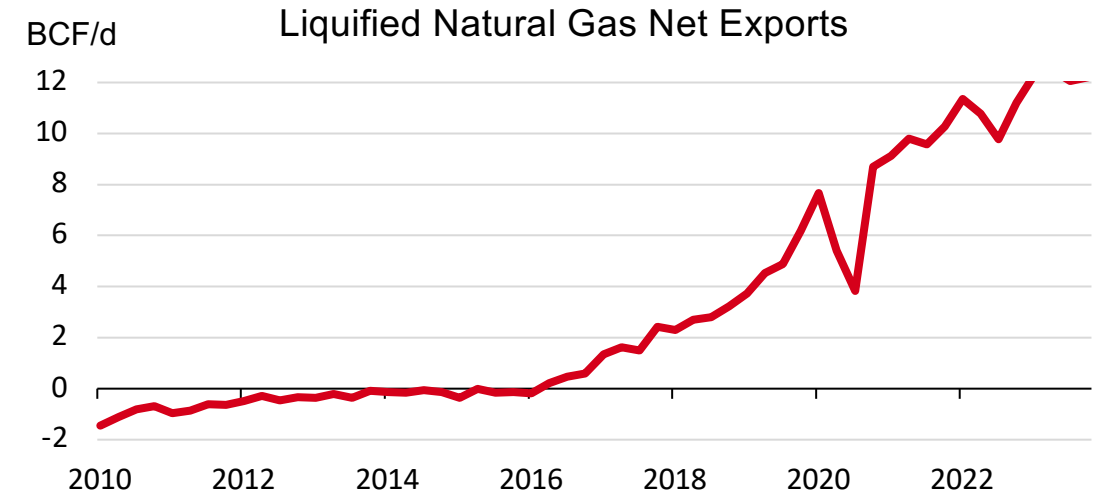
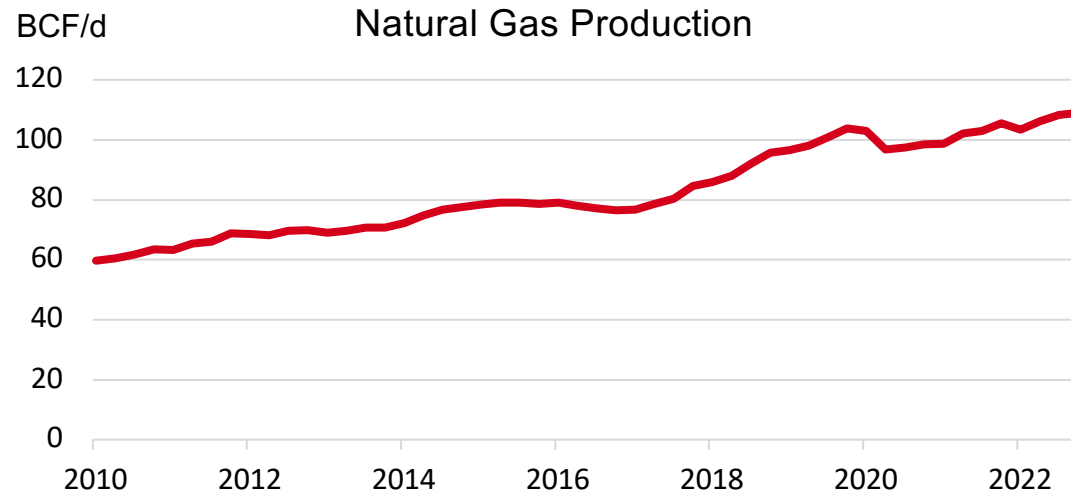


US Crude Supply – Pandemic Impact and Recovery

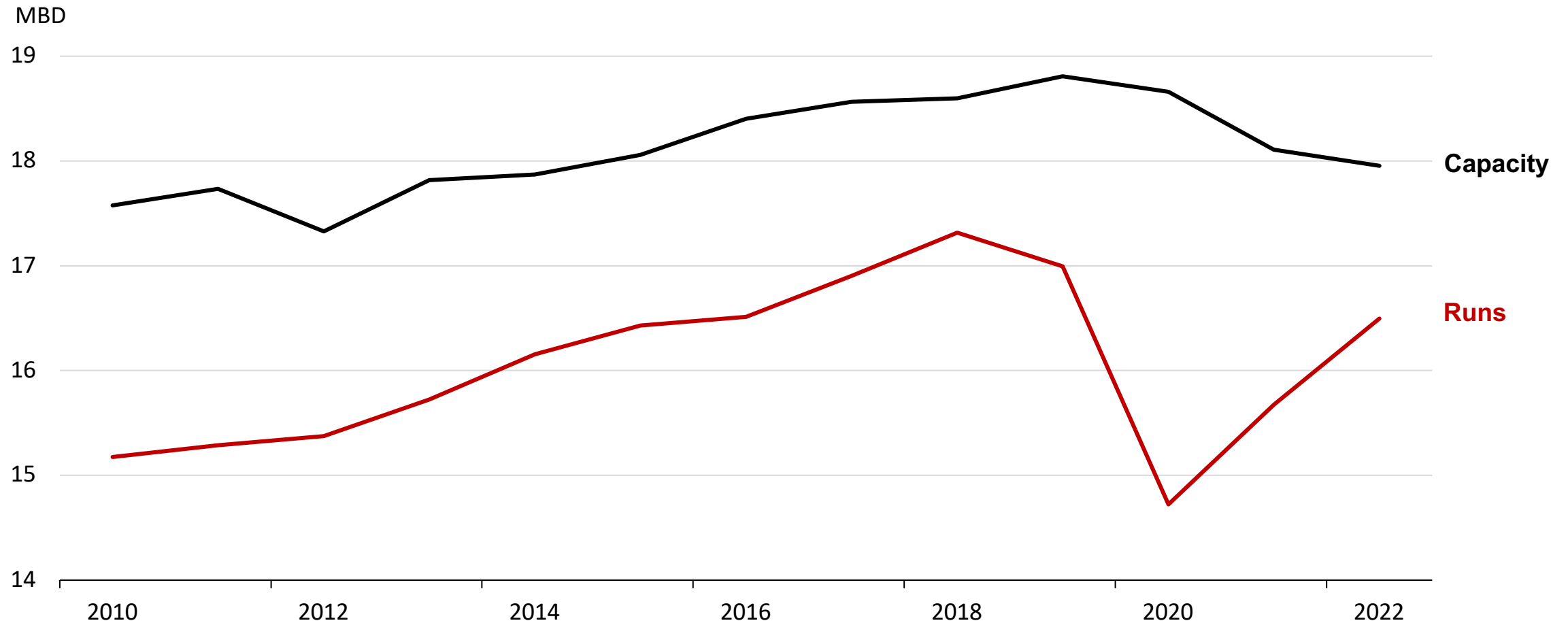


- Growth in crude production improves resilience
- Recovered close to pre pandemic levels
- Imports / Exports to balance grades and processing capability

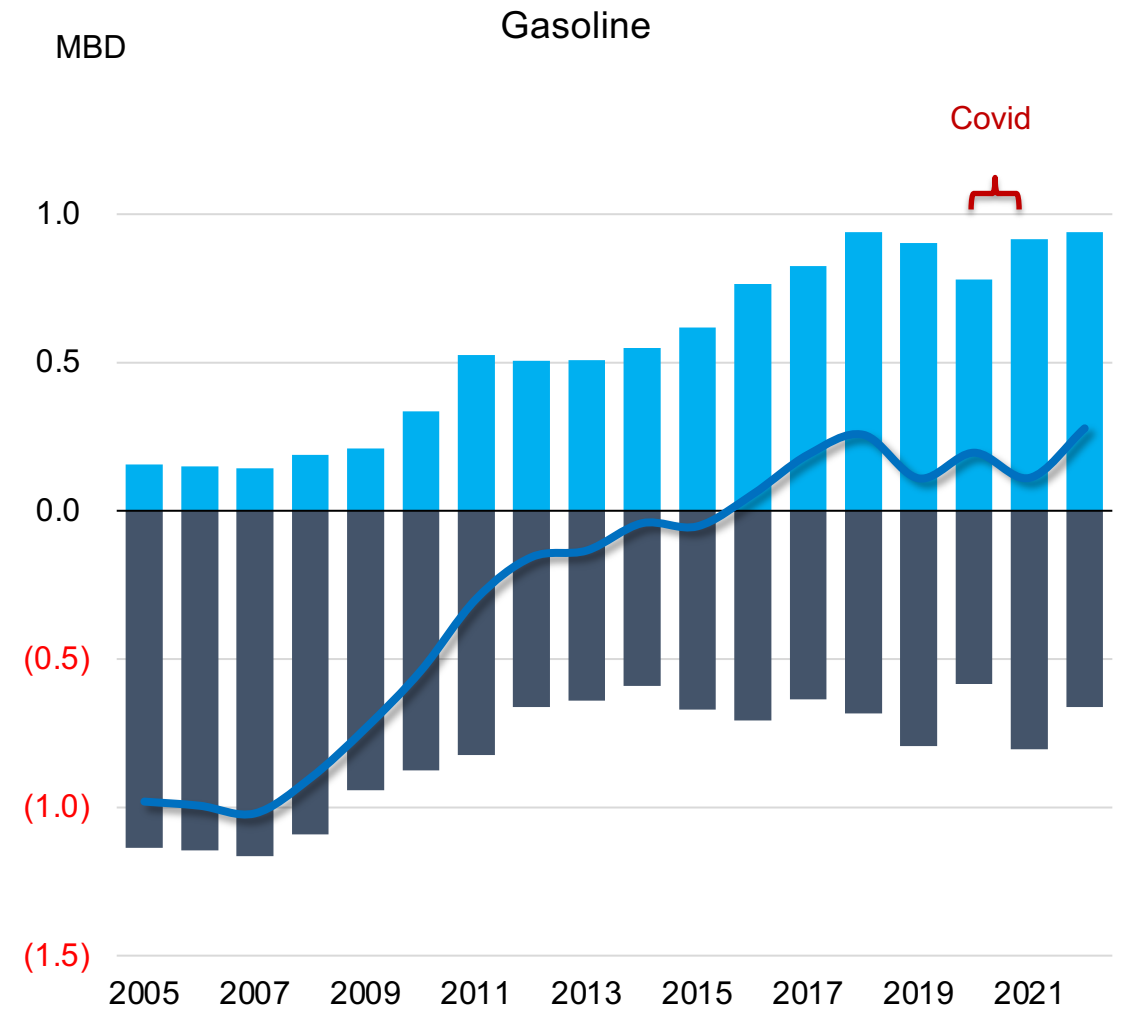
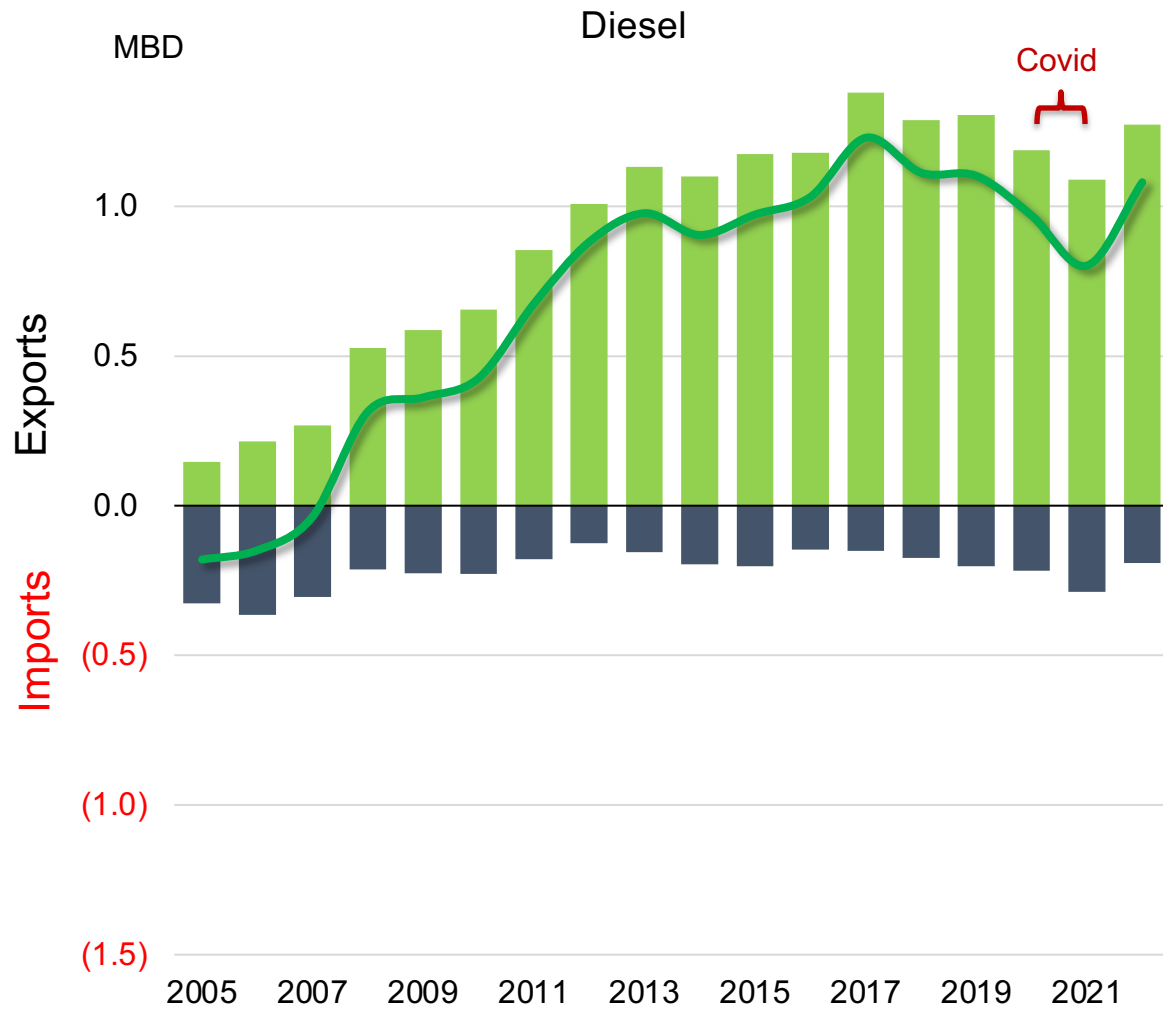
US Natural Gas and NGLs – Continued Production Growth



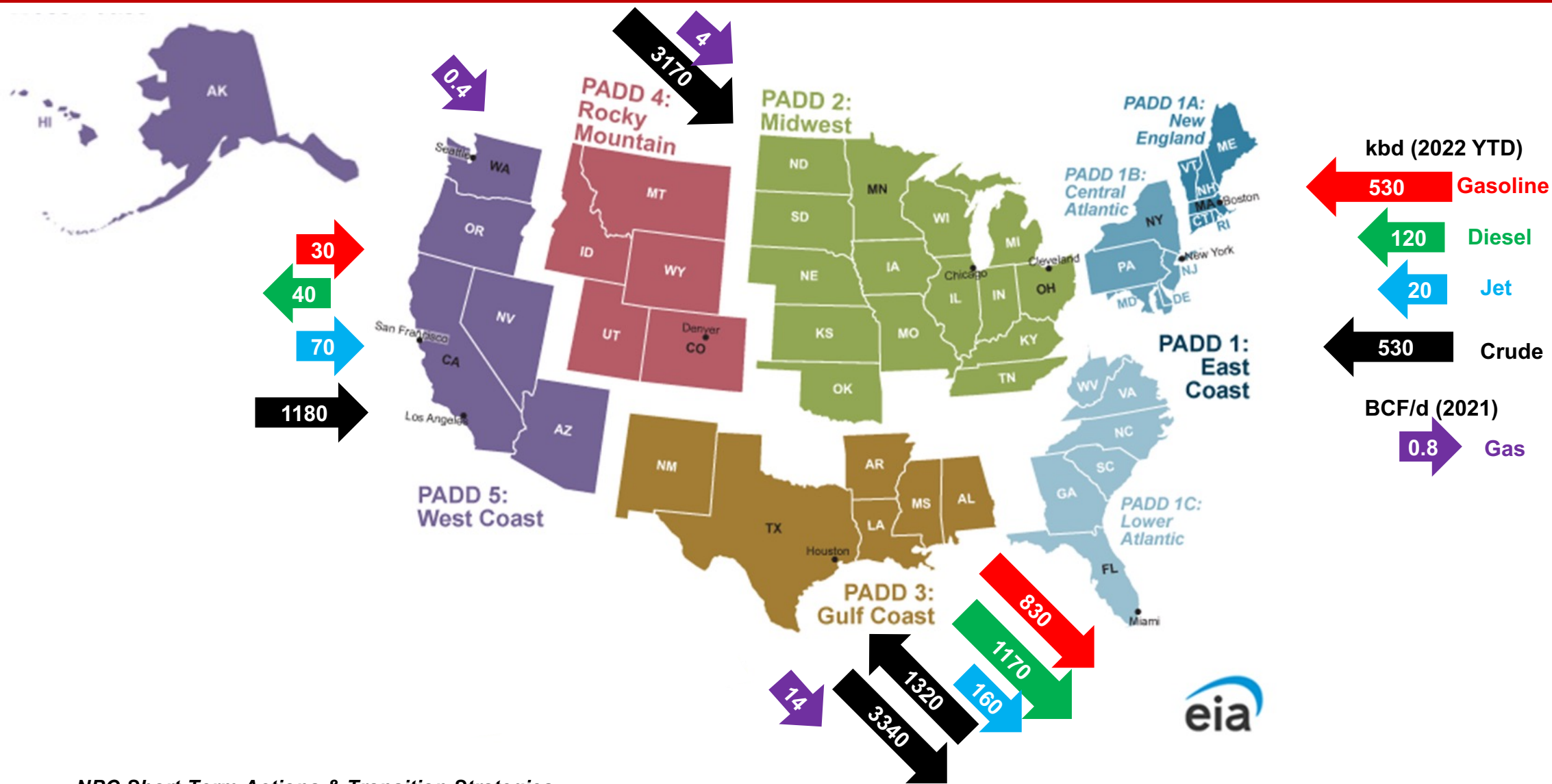
US Refining – Capacity Decrease but now Running Full



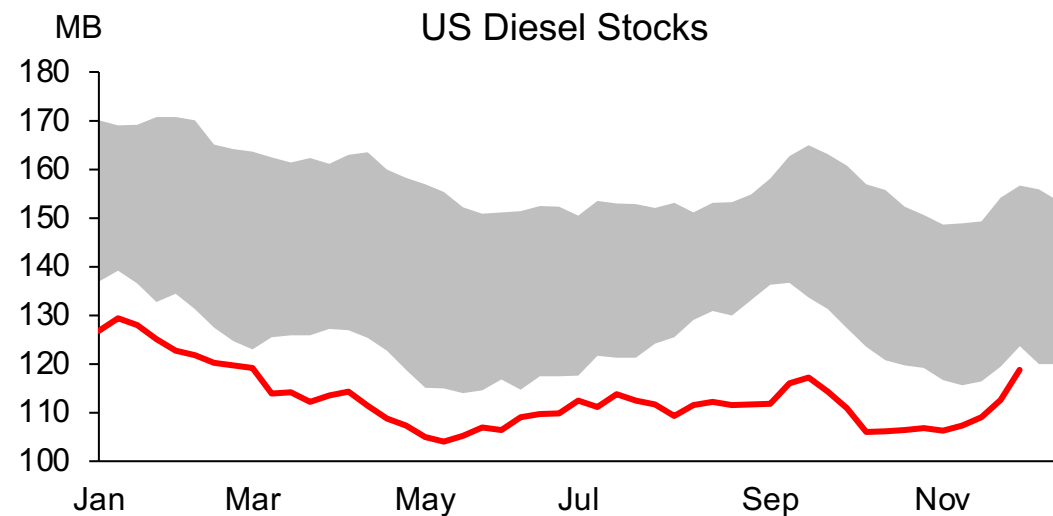
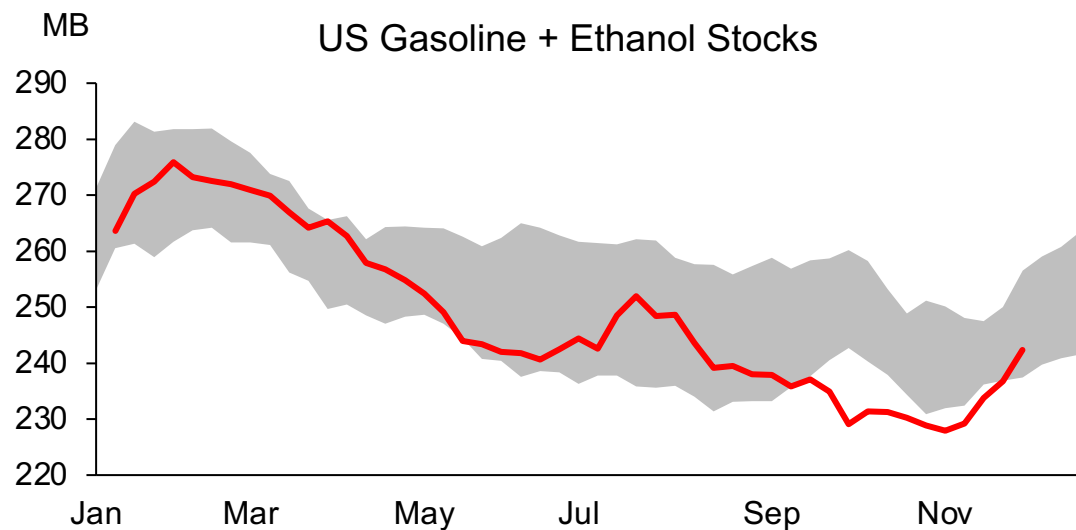
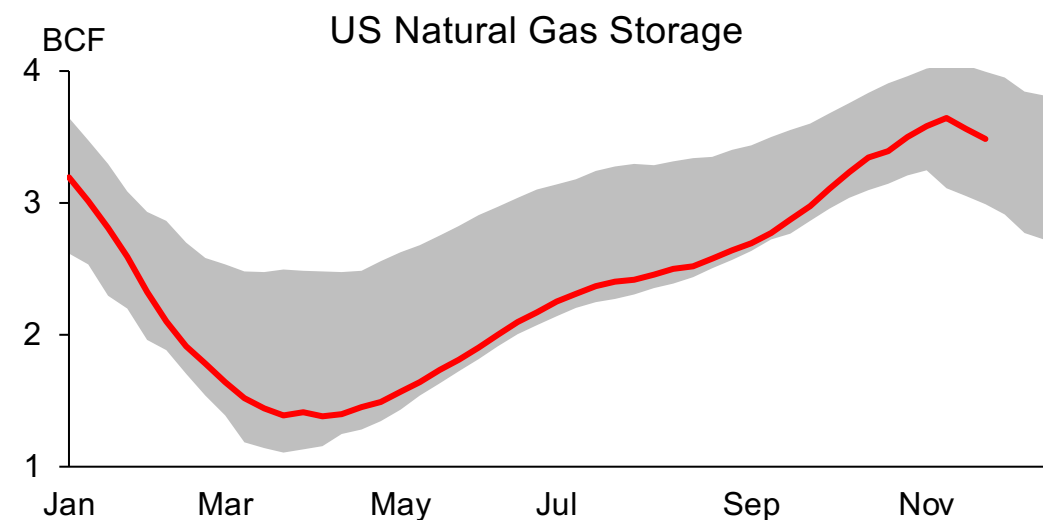
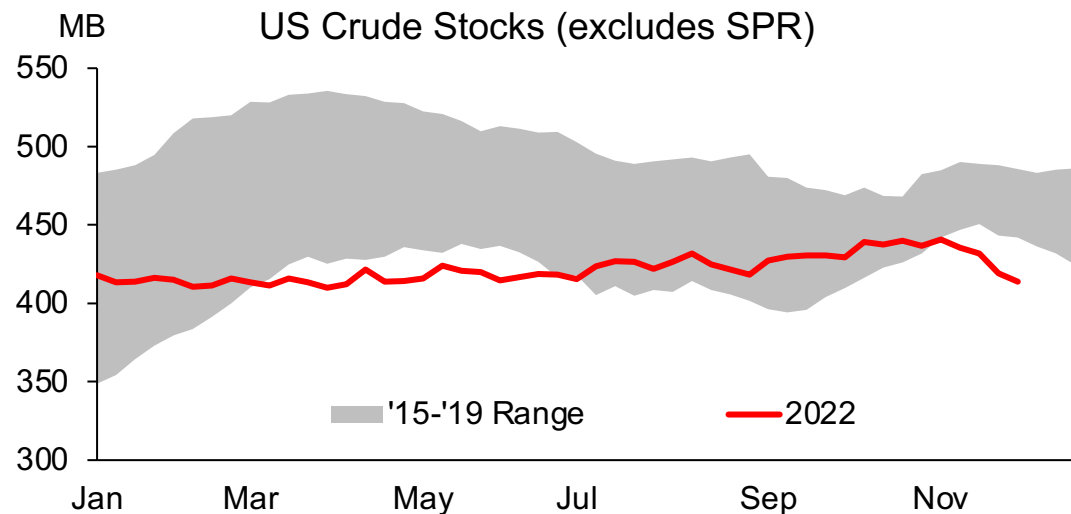
US Gasoline and Diesel Net Exports Improve Resilience



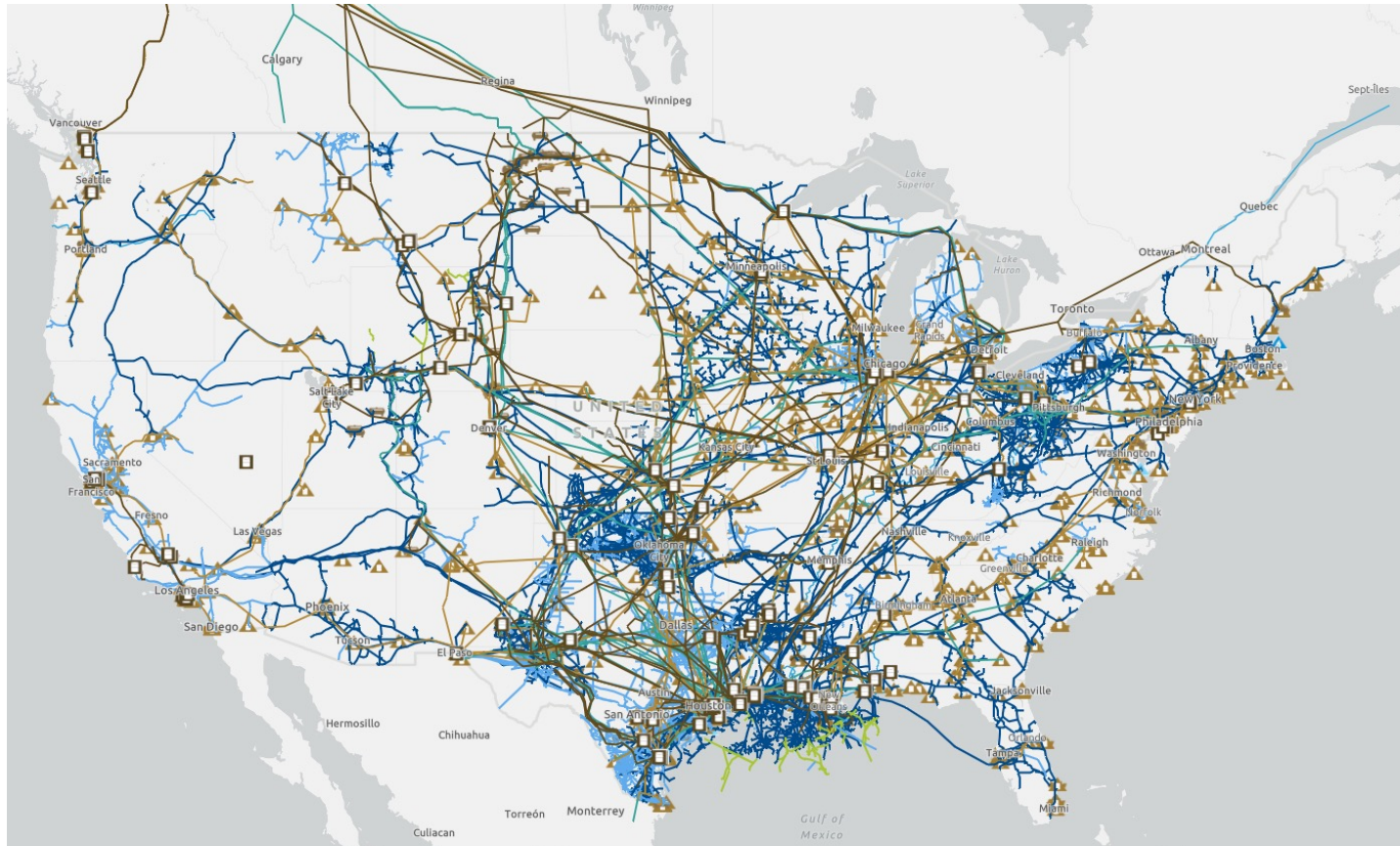
US Trade Flows Optimize Supply and Demand with Full Logistics



Commercial Inventories Recovering



Emergency Response



Source: EIA

- **Resilience of energy system**
 - Increased oil and gas production / exports
 - Infrastructure permitting process complex
- **2014/2016 NPC study recommendations**
 - Significant progress made
 - Sustainment of joint government / industry work key
- **Potential New threats**
 - Cybersecurity, physical damage to infrastructure, damage from extreme weather
- **Government / industry response**
 - Generally working well
 - Industry / government collaboration could be improved

Key Findings from Study

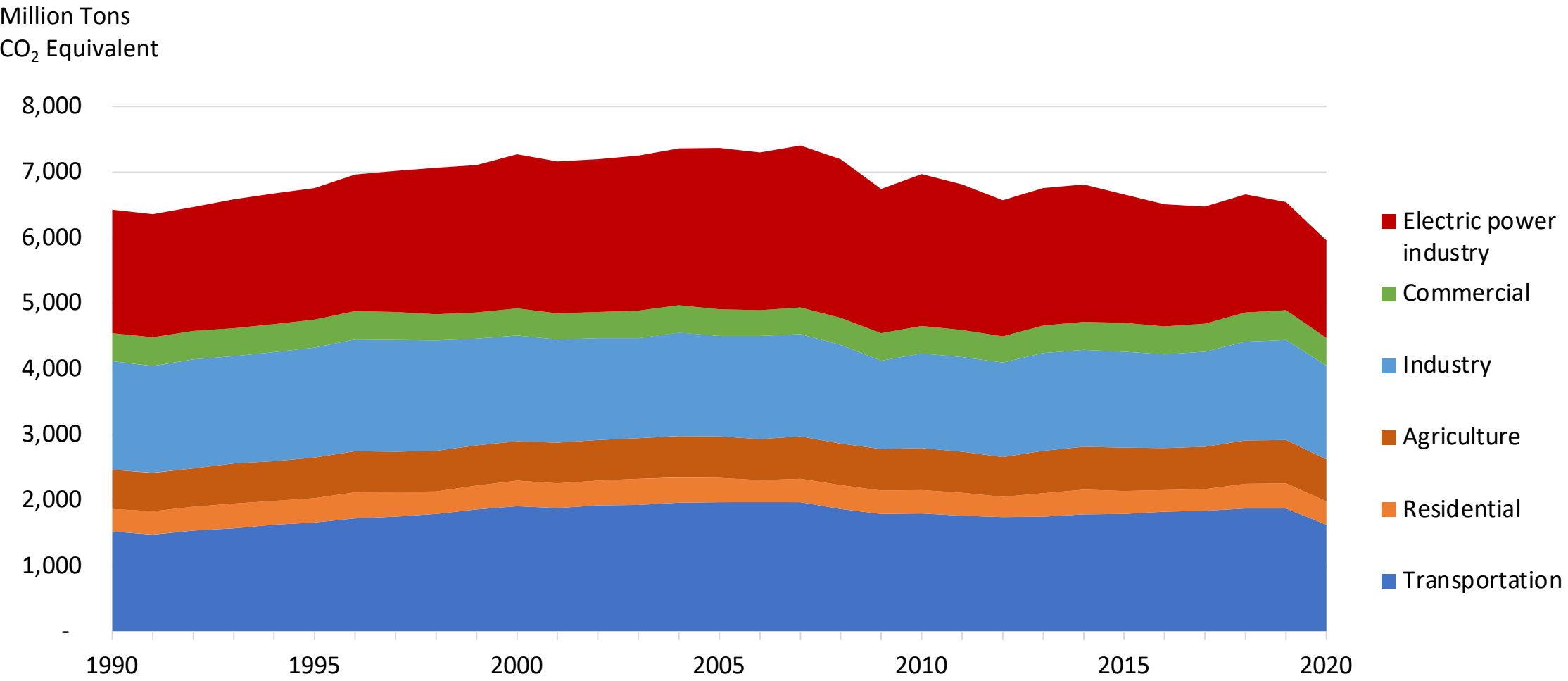
- **U.S. resilience increased by growth in domestic Oil and gas production**
- **Global markets have rebalanced driven by price changes**
- **Tightness in crude and products is global, U.S. key part of global market**
- **Price swings impact consumers**
- **Reducing barriers to resupply and product movement help ensure resilience and lowest price**
- **Emergency response has been enhanced but several potential improvements identified**

Short Term / Emergency Response Recommendations

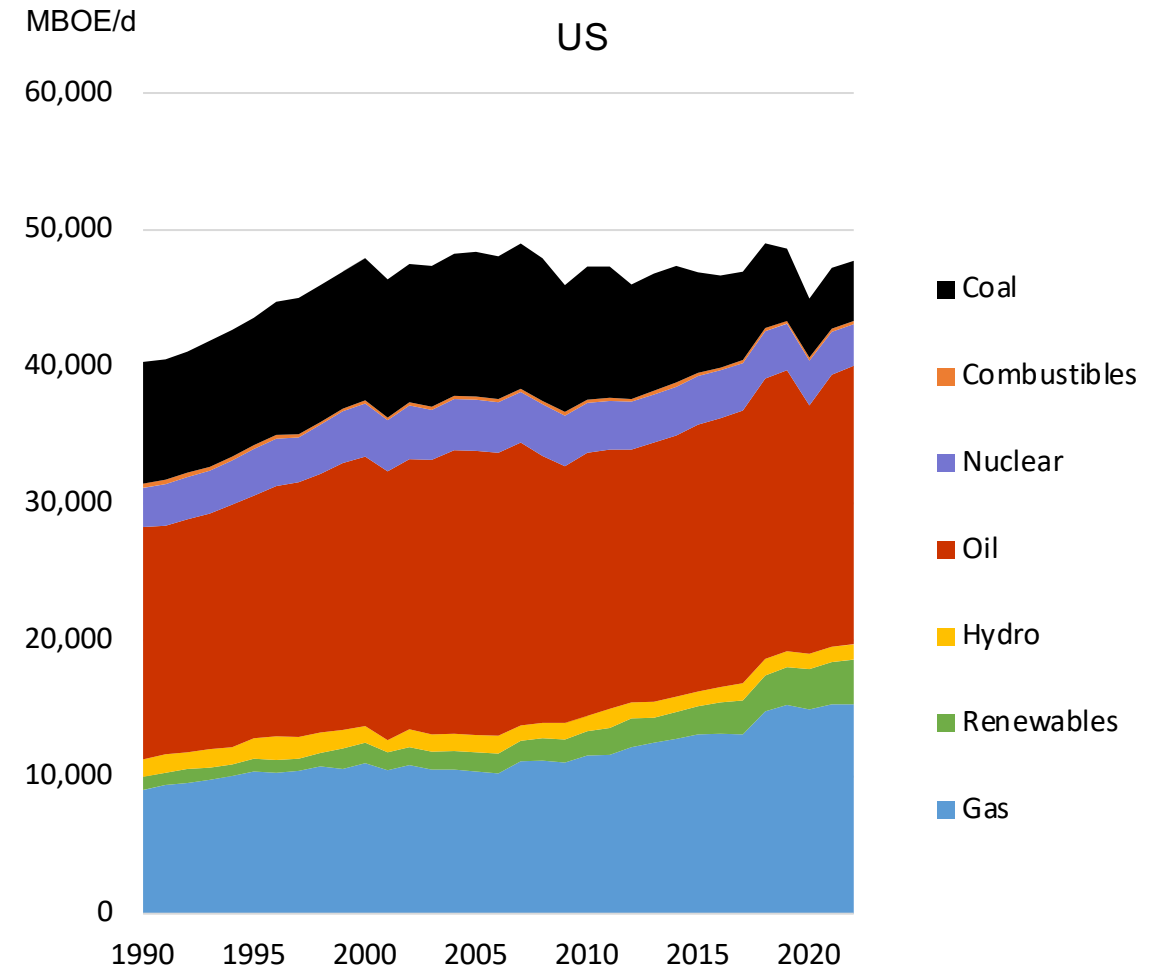
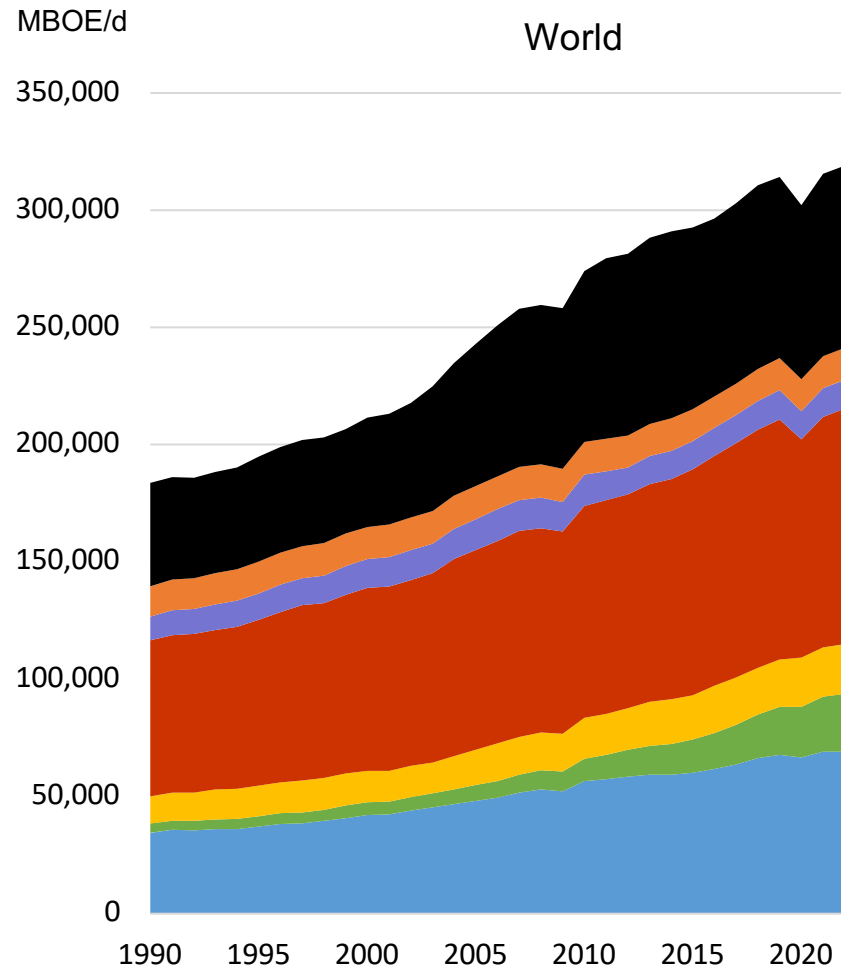
- **Support continued crude oil and product exports**
- **Reform certification and permitting of energy infrastructure and logistics**
- **Jones Act – facilitate and expand waivers**
- **Postpone rebuilding the Strategic Petroleum Reserve**
- **Encourage industry Investment across all forms of energy**
- **Relax fuels specifications and labelling during times of supply disruption**
- **Explore options to increase further the utilization of spare refining capacity in China**
- **Continue progress on strengthening the ability of the United States to respond to supply disruptions**
 - Prepare a process to establish company executive representation in times of disruption
 - Ensure progress on the 2014/2016 NPC study recommendations is sustained
 - Focus on increasing domestic production and enhancing infrastructure

Principles and Oil and Gas Industry Initiatives and Technologies for Progressing to Net Zero

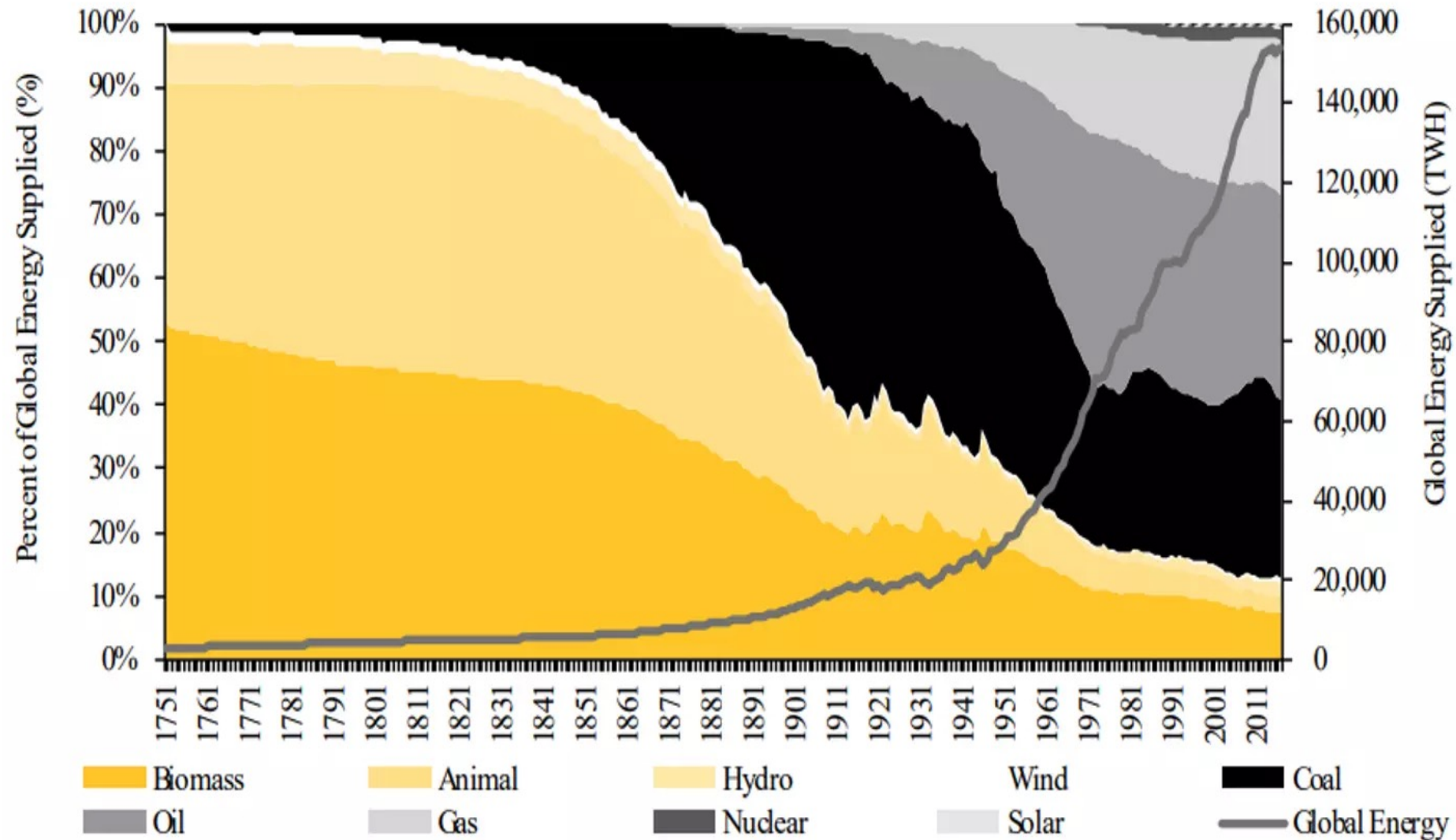
United States CO₂ Emissions Reduced While Economy Grows 50%



Total Energy Demand by Source



Energy System Transitions Have Historically Taken Time



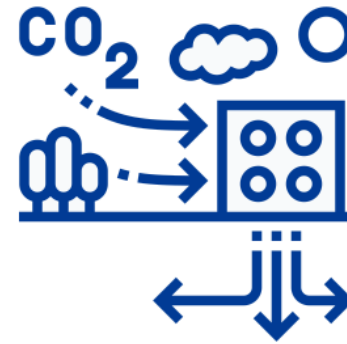
Technologies Needed for Transition Leverage Oil and Gas Competencies



Carbon Capture & Sequestration



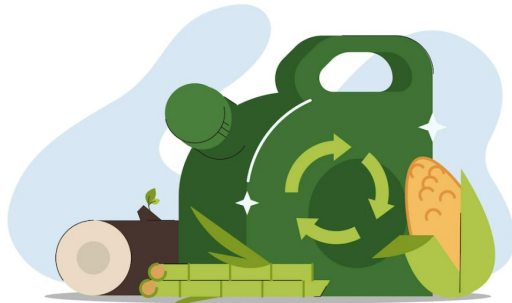
Energy Efficiency



Direct Air Capture



Geothermal



Renewable Fuels



Methane Abatement



Hydrogen

Implementation of technologies incentivized by IRA

Principles to Enable a Successful, Timely Transition

- **Transition should be focused on GHG reduction and be energy source agnostic**
- **Increased technology collaboration (Industry, academia, government) is required to accelerate transition**
- **Energy transition will require significant investments**
- **Effective policy support is required to accelerate deployment and cost reductions**
- **Policies that inadvertently cause shortages should be avoided**
- **Oil and gas industry has an essential role to play to help reduce emissions**
- **Federal, state and local governments also have essential roles to play**

Policy Critical for a Well Managed Energy Transition - Recommendations

- **Focus policies on reduction of CO₂ emissions and avoid selecting favorite technologies or industries**
- **Take account of uniqueness of the U.S. energy endowment vs replicating foreign policies**
- **Avoid premature phase out of traditional energy**
- **Focus on incentives for renewable energy and decarbonization technologies vs penalties for traditional energy**
- **Consider energy security and economic robustness as well as GHG reduction**
- **Continue to accelerate innovation and technology deployment through government policy and DOE funding**
- **Improve cohesiveness and predictability of infrastructure permitting**
- **Managing impact to consumers is vital for a well managed and fair transition**

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Short-Term Actions & Transition Strategies

Petroleum Market Developments – Progress and Actions to Increase Supply and Improve Resilience

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Deployment of Low Carbon Intensity Hydrogen Energy at Scale

Progress Report

Austin Knight
Coordinating Subcommittee Chair

December 14, 2022

Why hydrogen is a promising lever to support decarbonization



Hydrogen could be a **viable low carbon intensity fuel source for hard-to-abate sectors** like certain types of **industrial processes, transport, power and residential and commercial heating**

Technologies already exist to produce and distribute low-carbon intensity hydrogen **at varying levels of technical and commercial readiness**

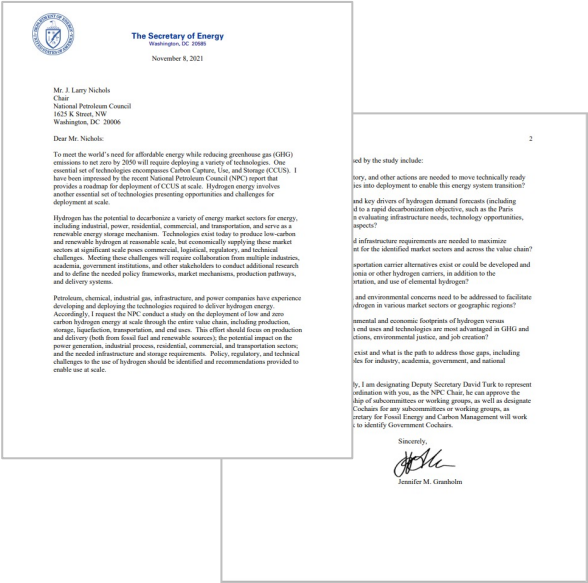
The breadth of **US geographic diversity and natural resources, such as abundant wind, solar, and natural gas, offer many potential production pathways** to produce low carbon intensity hydrogen at scale

Recent federal government policy, such as the Inflation Reduction Act and Bipartisan Infrastructure Law, **incentivize the scale up of hydrogen**

Secretary of the Department of Energy requested the study address seven key questions

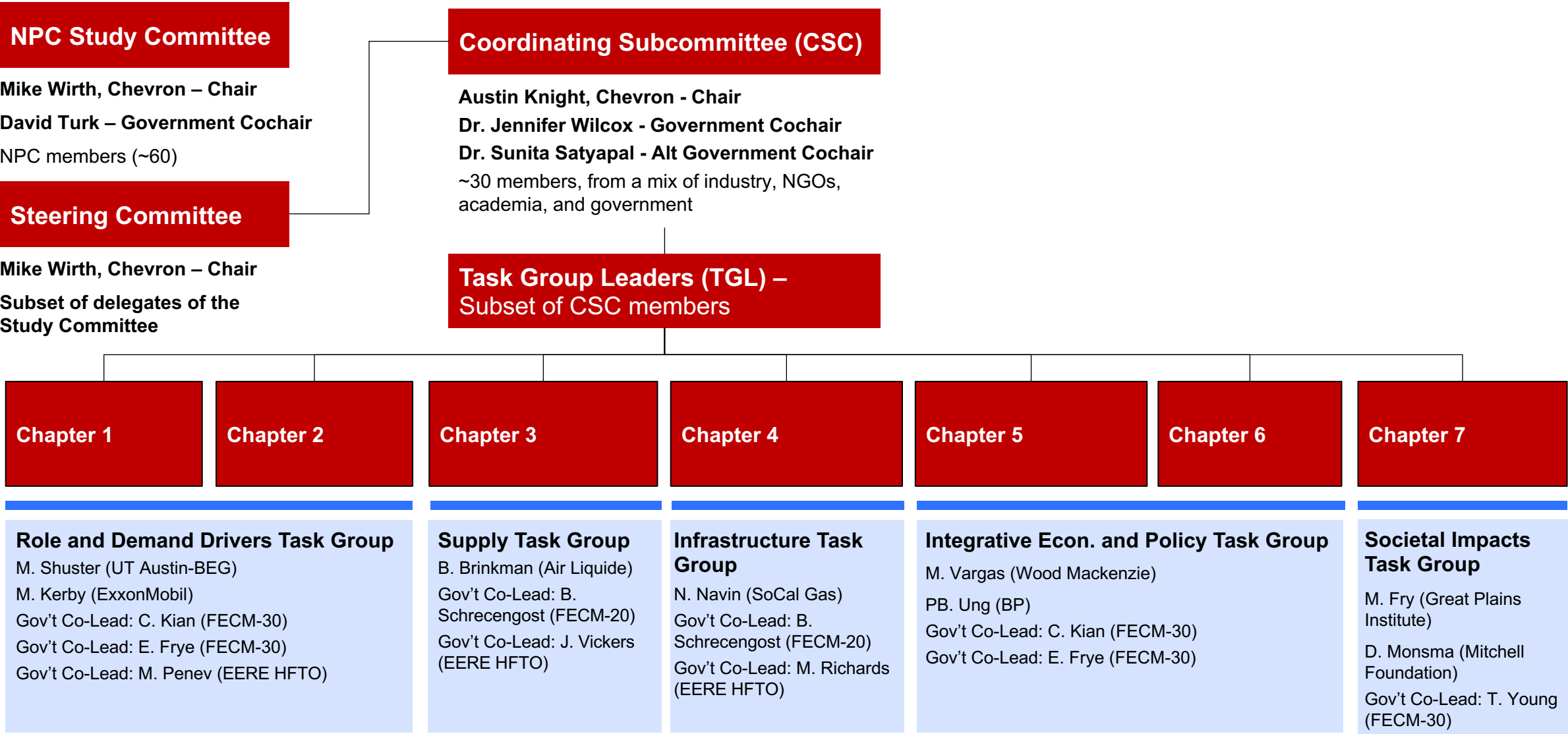
NATIONAL PETROLEUM COUNCIL

Key questions the study is addressing



1. What **policy, regulatory, and other actions** are needed to move technically ready hydrogen technologies into deployment to enable this energy system transition?
2. What are the **range and key drivers of hydrogen demand forecasts** (including forecasts that are tied to a rapid decarbonization objective, such as the Paris Agreement) to use in evaluating infrastructure needs, technology opportunities, and relevant policy aspects?
3. What **integration and infrastructure requirements** are needed to maximize hydrogen deployment for the identified market sectors and across the value chain?
4. What hydrogen **transportation carrier alternatives** exist or could be developed and deployed, e.g., ammonia or other hydrogen carriers, in addition to the liquefaction, transportation, and use of elemental hydrogen?
5. What **health, safety, and environmental** concerns need to be addressed to facilitate the acceptance of hydrogen in various market sectors or geographic regions?
6. What are the **environmental and economic footprints** of hydrogen versus alternatives? Which end uses and technologies are most advantaged in GHG and other pollutant reductions, environmental justice, and job creation?
7. What **research gaps** exist and what is the path to address those gaps, including potential research roles for industry, academia, government, and national laboratories?

Governance structure

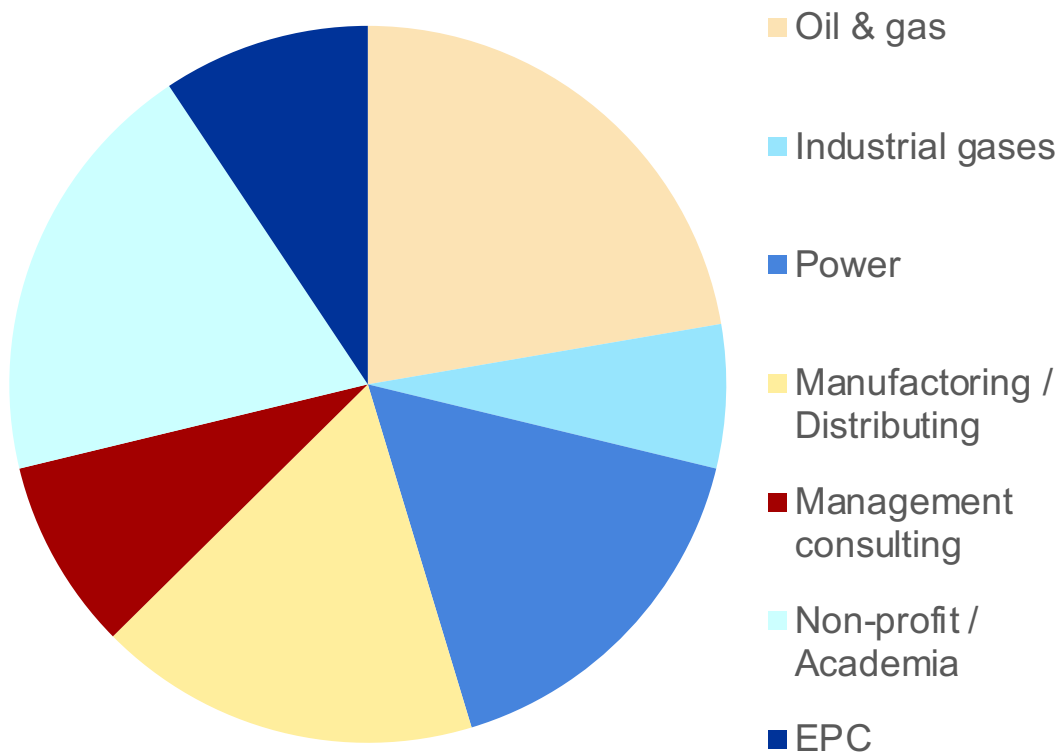


Study overview by chapter

Chapter	Content focus
Chapter 1 Role of low-CI hydrogen in the US	Outlook for potential hydrogen applications at scale in the US economy
Chapter 2 Demand drivers for low-CI hydrogen	Potential range of hydrogen demand with a focus on industrial processes, transport, power and commercial and residential heating
Chapter 3 Supply pathways for low-CI hydrogen	Pathways for hydrogen production and associated carbon intensities
Chapter 4 Infrastructure	Connecting supply to demand
Chapter 5 Integrated Economics	Analysis of hydrogen commercialization pathways across the value chain based on rigorous technoeconomic modeling
Chapter 6 Policy landscape and options	Considering current and future policy, legal, and regulatory landscape for scaling hydrogen in the US
Chapter 7 Safety, societal considerations & impacts	Addressing a broad range of safety and social considerations of interest to diverse stakeholders

Participants offer diverse, cross-industry perspectives

Overall study team composition



Key takeaways

- Membership represents a **wide range of organizations** including oil & gas, industrial gases, energy and power, manufacturing and distributing, EPC, non-profits, academia, and government
- Overall study team is composed of ~170 participants from over 50 different organizations

Guiding principles and progress to date

Guiding principles:



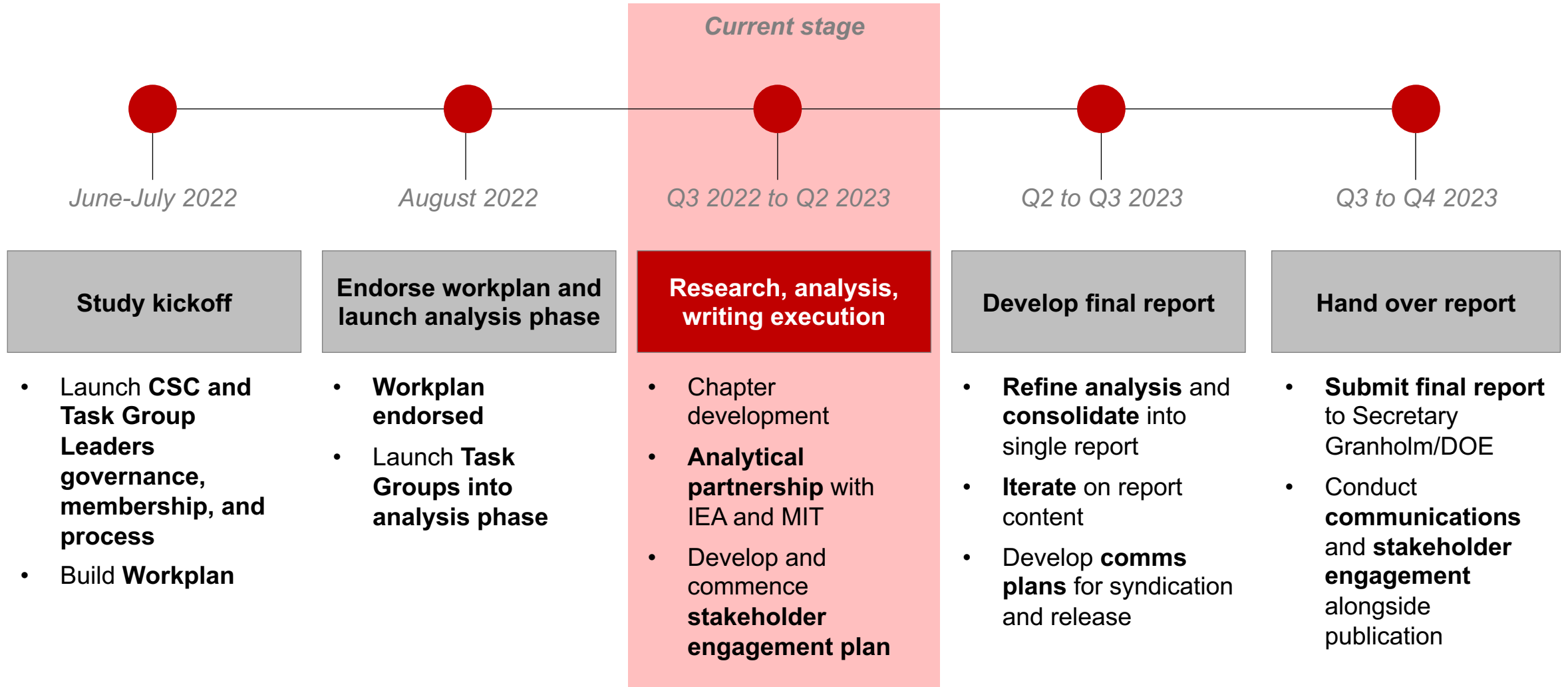
- Provide timely input recognizing that the hydrogen economy is moving rapidly
- To the maximum extent possible, leverage existing work to expedite progress – while drawing independent conclusions
- Ensure that safety, societal considerations, and impacts are considered holistically and comprehensively throughout the study

To date the study has:



- Established a governance structure which engage regularly with study content and progress
- Study workplan endorsed by Study Committee
- All Task Group leaders are in place, including DOE co-chairs; Task Groups have achieved critical membership participation
- Formed analytical partnerships with IEA & MIT
- Established routine engagement cadence with adjacent NPC studies

Study Timeline



National Petroleum Council

Deployment of Low Carbon Intensity Hydrogen Energy at Scale

Progress Report

December 14, 2022

National Petroleum Council

Natural Gas Greenhouse Gases Study

Progress Report

John M. Dabbar
Coordinating Subcommittee Chair

December 14, 2022

U.S.-Produced Natural Gas, an Essential and Abundant Resource

- **U.S.-produced natural gas** plays an essential role in **energy** and **economic security**
 - This resource can continue to provide **reliable** and **affordable energy**, both domestically and abroad, if its emissions footprint is reduced and, ultimately, eliminated or offset
- The GHG Study, with the objective to “**assess greenhouse gas (GHG) emissions reduction plans and potential across the U.S. natural gas value chain**,” commenced **late October 2022**
- This study will be governed by the **Study Committee** and the **Steering Committee** and executed by the **Coordinating Subcommittee** (CSC) and Task Group Chairs (subset of CSC)
- The study will be executed by five **Task Groups** comprised of CSC Task Group Chairs and DOE Cochairs. These Task Groups will consist of additional **Subgroups** where applicable.
- The final report will address the six DOE requests and additional questions by providing policy and technology findings and recommendations for the legislators, regulators, and the O&G industry
- The **first milestone, approval** of the work scope and **GHG Study Workplan**, was reached around mid-November
- Targeting a final report delivery date of ~ **April 2024**

Final Report will address the U.S. Targets, Key Requests in the Secretary's Letter, and Related Issues

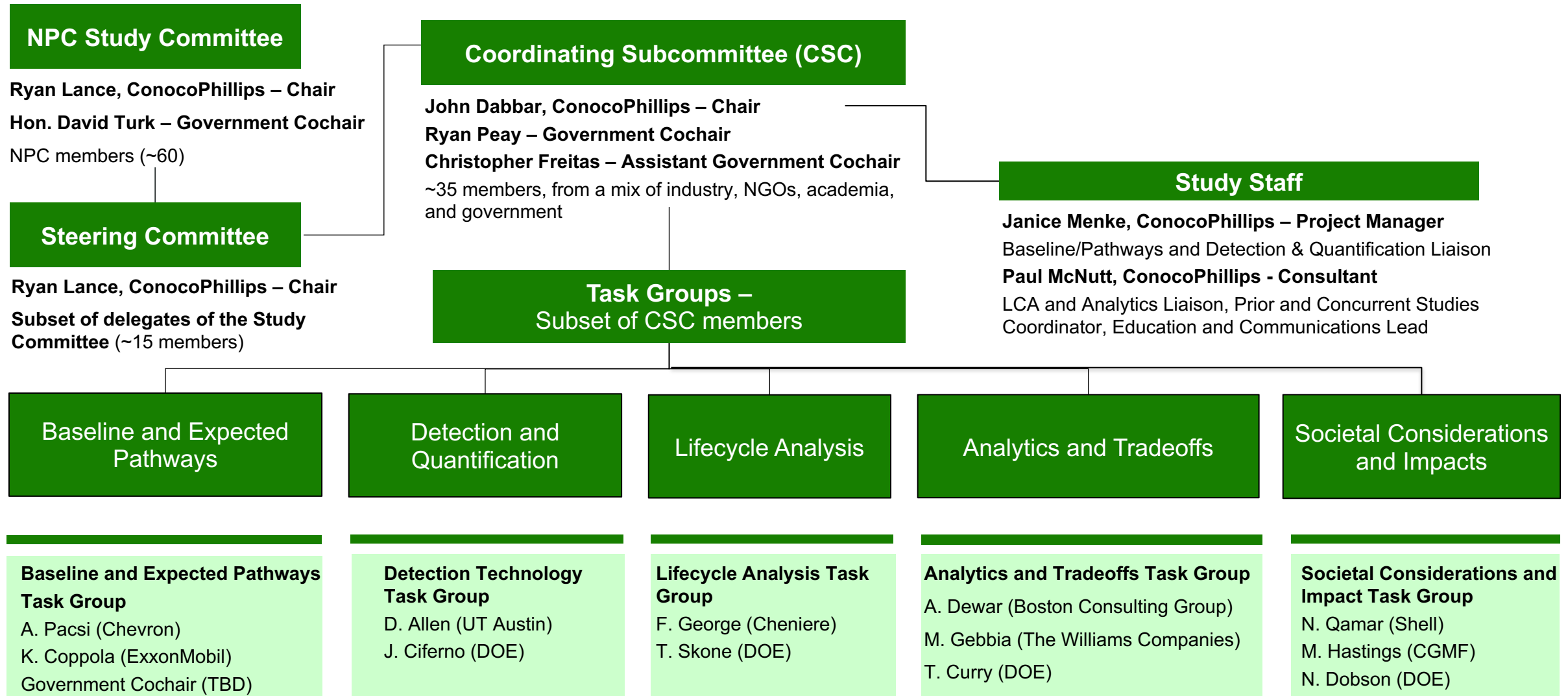
Report will address three U.S. targets

- 1 50 to 52 percent reduction in greenhouse gases (GHG) from 2005 levels by 2030
- 2 Net zero emissions economy-wide by 2050
- 3 Achievement of the Global Methane Pledge

And six key requests

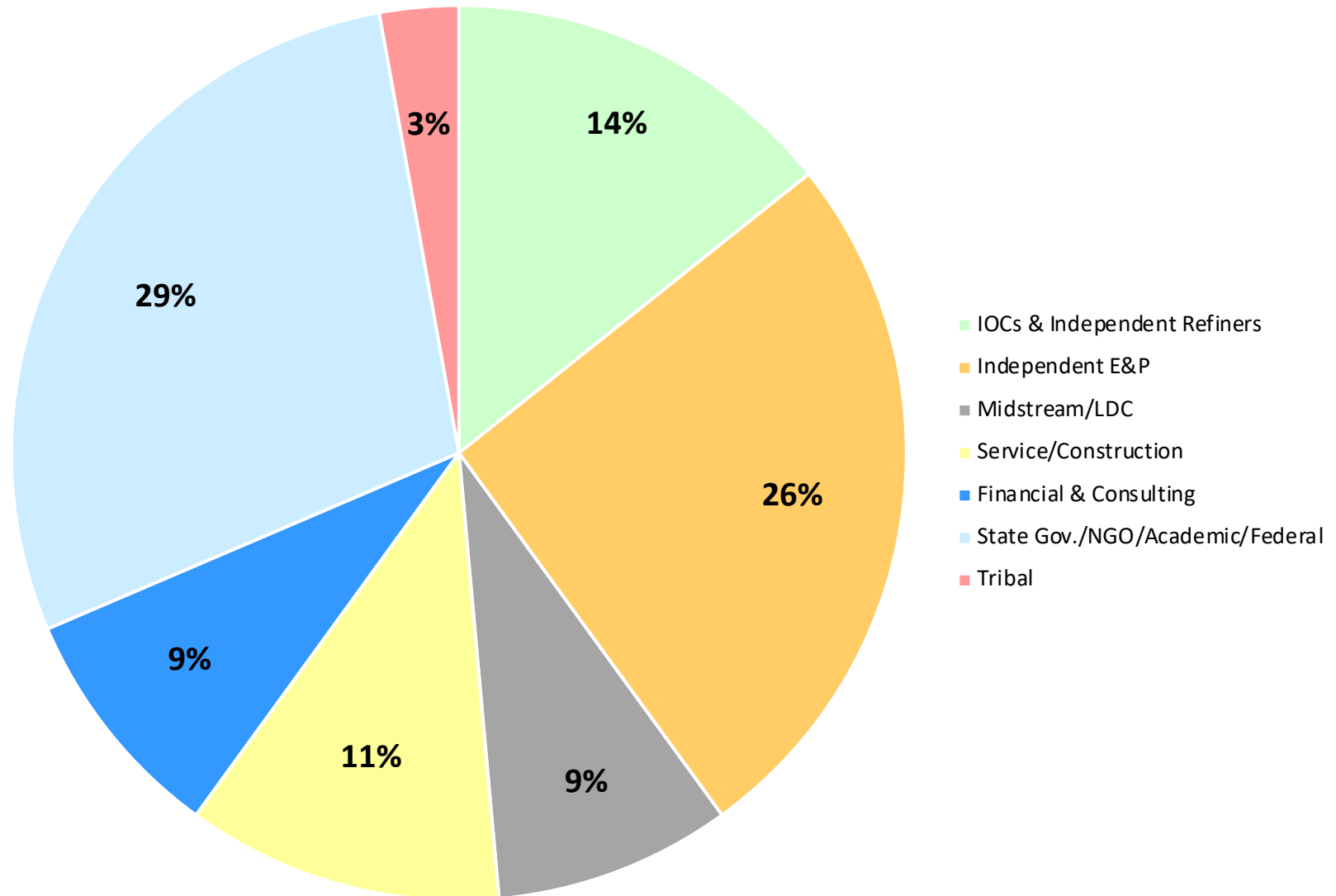
- 1 Characterization of existing U.S. industry GHG emissions reduction plans
- 2 Identification of most impactful, cost-effective and achievable GHG reduction opportunities
- 3 Exploration of best options for detection of U.S. GHG emissions
- 4 Discussion of modeling frameworks for life-cycle emissions analysis
- 5 Discussion of tradeoffs
- 6 Evaluation of the feasibility and effectiveness of different approaches

Study Governance and Operating Model

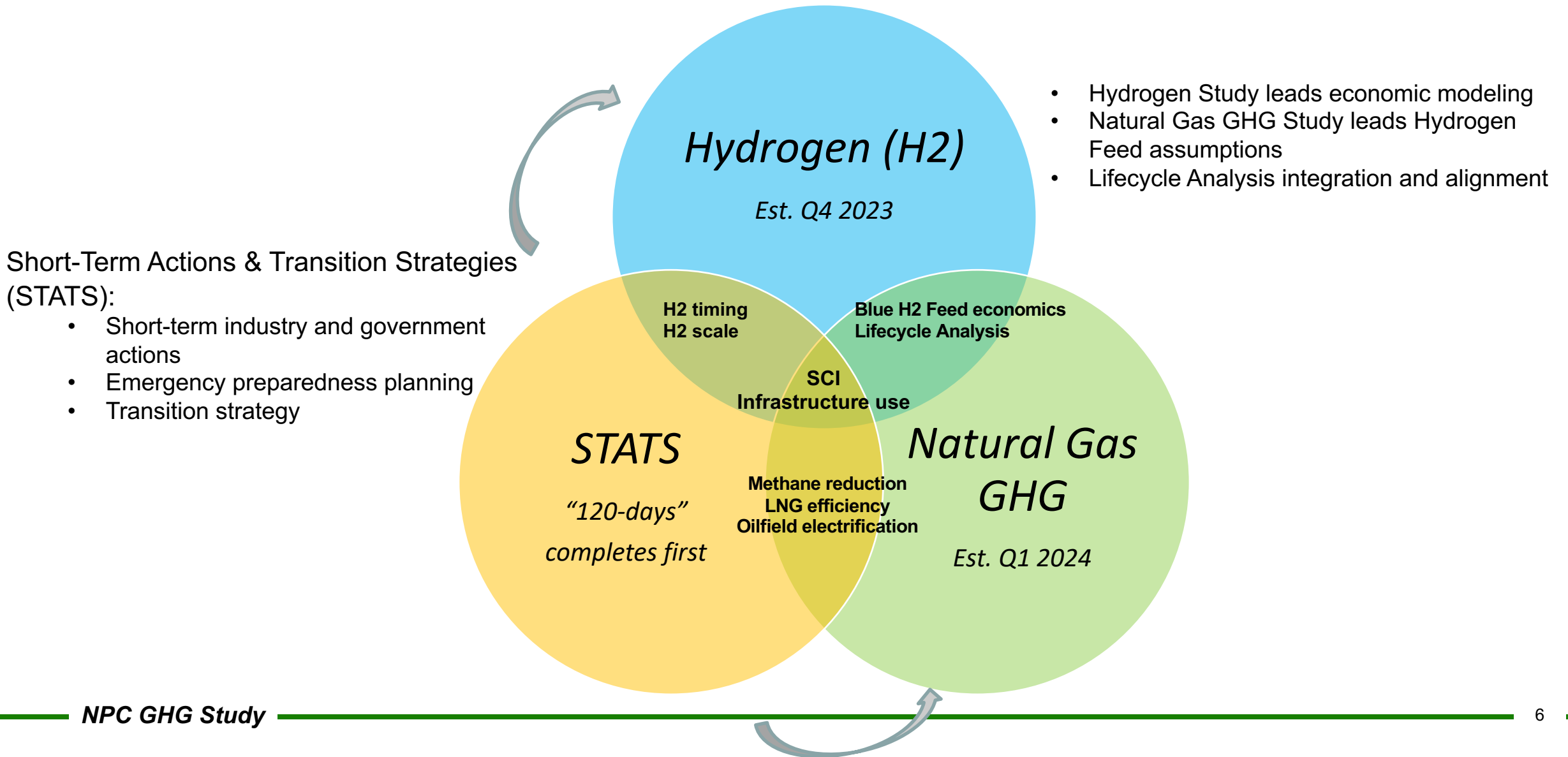


CSC Membership Representing a Diverse Set of Stakeholders

- The CSC currently consists of ~35 members from 32 companies, organizations, and academia
- Monthly meetings are scheduled across the country to discuss progress of the study and identify gaps/other issues



Integration with Concurrent NPC Studies



Progress to Date and Path Forward

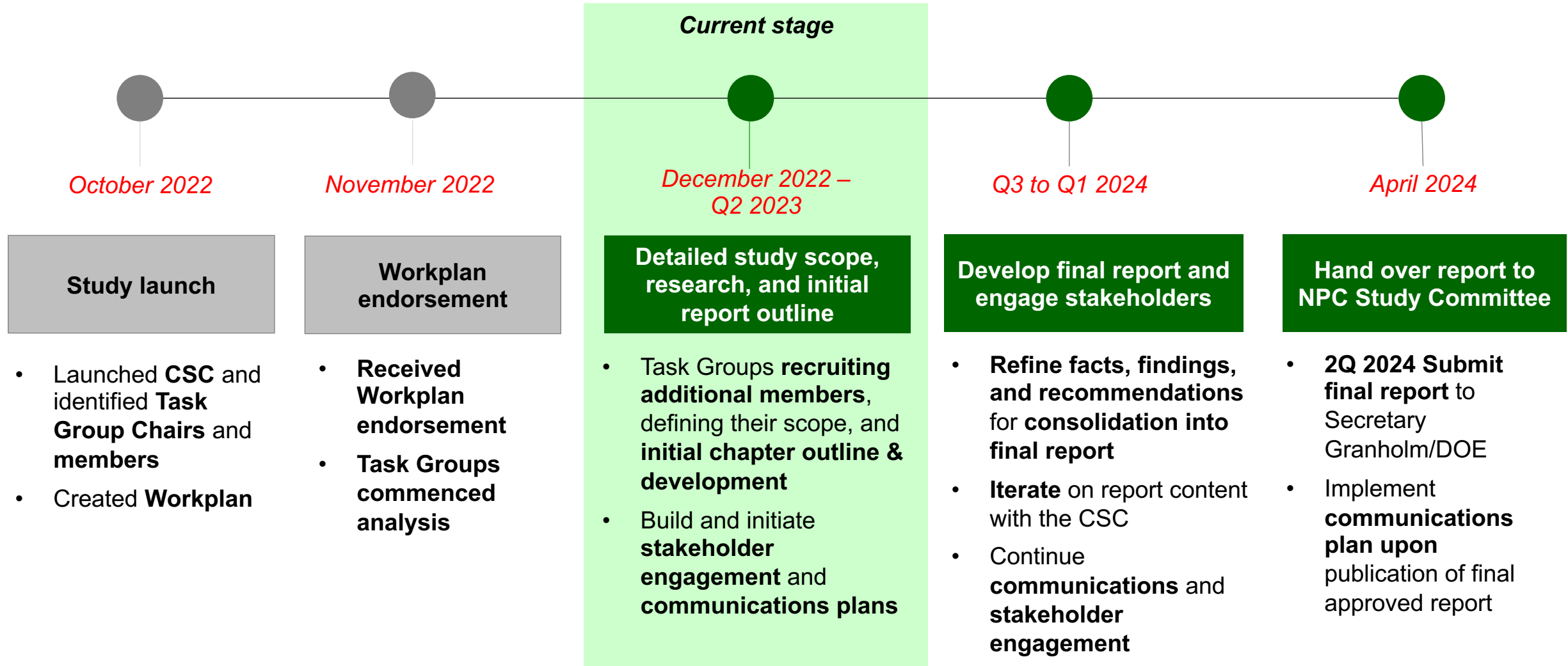
Progress to date

- Staffed CSC and Task Group leadership
- Stood up proposed Task Groups and Subgroups with ~140 confirmed Task Group and Subgroup members (*in progress*)
- Identified initial main topics and progressed alignment on definitions and key assumptions
- Developed initial chapter outline
- Obtained Natural Gas GHG Study Workplan approval
- Established proper integration between the Natural Gas GHG and two other concurrent NPC studies

Path forward

- Develop initial chapter content building on the findings and recommendations of the STATS Study
- Continued integration of Lifecycle Analysis and Societal Considerations and Impact with the Hydrogen Study
- Identify study membership gaps and recruit additional expertise
- Manage scope growth and study timeline
- Early development of communication plans and commencement of stakeholder engagement

Natural Gas GHG Study Milestones



National Petroleum Council

Natural Gas Greenhouse Gases Study

Progress Report

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**Meeting webcast available at
<https://www.npc.org>**
